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Buy a \$40 enthalpy monitor and learn what is important to your family's comfort
Unhealthy Volatile Organic Compounds (VOCs) Common In Conventional Homes
Persistent Organic Pollutants (POPs) – Making The Entire World Toxic
Energy Star ® and Lost Heat Recovery Solutions
Lighting, Virtual Windows, and Energy Efficient Computer Displays
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- Important Lessons from Copernicus, Columbus, and John Kennedy
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Builders Who Continue To Reject Increased Profitability
The Arrogant Architect (who reinvented his own disastrous square wheel)

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A Hundred Years of U.S. Government Subsidizing Dead-End Petroleum (and still are)
Negawatts Not Enough – We still can't avoid deadly electric power grid overload failures
Today's homebuyers apparently PREFER the very WORST homes allowed by law
How Expensive Is a "Low-Cost" Conventional Home? (\$150,000+ in energy bills)
Zero Energy Homes have ZERO net annual utility bills – R U Interested?
America's Bad Habit Addiction Is Way Beyond The Critical Need For Intervention
Politically Incorrect Confrontation – An Absolute Necessity Long Ago
The New Millennium American Energy Crisis Is WAY BEYOND STUPID!
How Did American Energy Policy Fall To Where It is Today? (Petroleum Subsidies)

Critical Turning Point Disaster – 100 million coastal residents may soon be flooded
Inept, Inefficient, Government Subsidized Housing – Facilitating Urban Failure
Public Information Sharing – The solution is EDUCATION about proven solutions
Construction Product Integration – Putting Pieces Together – Holistic System Engineering
New ZED Legislation – Subsidize The CORRECT Solution + Those Being Hurt The Worst
Energy “Sin Tax” and Energy “Luxury Tax” (Also See Chapter Nine)

Chapter Five: What Is A Zero Energy Design Home?

U.S. Department of Energy Design Recommendations
Diverse Architectural Design Pattern Options
Zero Energy Design Priorities and Cost-Effective Innovative Utility Bill Elimination
Heating and Cooling Bills, Refrigerator, Domestic Hot Water, Clothes Dryer
and Washer, Cooking Range and Oven, Dishwasher, Lighting
U.S. City Degree Day Heating versus Cooling Requirements – Place-Based Design
Detailed Specific Location Example, Future Global Warming Impact Possibility

Chapter Six: ZED Architecture and Technology Overview

Nutshell Summary of Many Bad Architecture Things To Avoid
Numerous Different Technologies Are Available To Eliminate Utility Bills
Energy Conservation Is 90% Of ZED's Primary Objectives, Free Sunshine
Solar Thermal Energy, Photovoltaic Electricity From The Sun, (Solar Cooling Chapter 12)
One Story, or Two - Shape, Size, Appearance, and Orientation
Street Appeal – Artistically Attractive (Often energy inefficient – Architects haven't a clue)
Reducing Undesirable Heat Flow Summer and Winter, with SUPERINSULATION
Radiant Barriers – Much More Important Than Other Insulation (in hot humid climate)
Two Small Delta T's Are MUCH Better Than One Large Delta T
Structural Insulated Panels (SIP's) – Cost Effective, Fast and Strong
Air Seal Top and Bottom Plate Perforations
Hot Water Clustering – Nearly Instant Lower-Cost Hot Water
Air Leak Detection - Calibrated Fan / Instrumented Inspection
Foundation Insulation and Shading
Energy Efficient Windows – Over 100 ZED ways to eliminate window heat transfer
Natural Daylight and Window Views of the World
Automated, Filtered, Controlled Fresh Air Intake
Second Means of Egress (Insulated doors work better than windows)
Passive Solar Heating, and South Side Sunroom / Solarium Aesthetics
Dazzling Interior Glass Walls and Magic Mirror Aesthetics
Advanced Technology Lighting Alternatives – Computer Animated RGB LED's
Virtual Windows – Cost Less, More Efficient, Flexible, and Beautiful Than Real Windows
Averaging Diurnal (24-Hour) Day and Nighttime Temperatures
We caution homebuyers AGAINST the use of popular “ionic” air fresheners
Passive Solar Cooling – Use Sunshine and Natural Resources To COOL Your Home
Earth Temperature Cool Tubes – A solution for some (but not all) locations
(Other superior low-cost cooling options and details discussed in Chapter Twelve)
Earth Sheltered Thermal Buffering – Super Sunny New Beautiful Designs
Absorption Chillers – Hundred-Year-Old Solution For The (Near) Future
Hot Water Heating, Solar Hot Water (Thermosiphon - Nothing that uses electricity)
Inexpensive Passive Solar Hot Water Heaters (One of your best energy investments)
Active Solar Hot Water Heaters (for climates with heavy freeze winters)

Swimming Pool, Swim Spa, and Hot Tub Solarium Design Issues
No Chlorine! – Chloramines Are Known Carcinogens
Solar Heat For Pool Water – Year round swimming can be surprisingly inexpensive
Waterfalls and Decorative Ponds – Inside or Out?
Automated Movable Swimming Pool Floor – Multiple Use Sunspace Flexibility
Automated Window Quilts – Conduction, Convection and Radiation Solutions
ZED Economics 101

Chapter Seven: Laundry and Cooking Zero Energy Design Issues

Spectacularly STUPID Conventional Laundry Room Energy and IAQ Disaster
Near-Zero-Energy Clothes Drying – NOT in Conditioned Interior – Efficient Washer
Top-Loaders versus Front-Loader Clothes Washers (less hot water, 1200 rpm spin)
Is Aluminum a Good Thing To Use In Your Kitchen?
Cancer-Causing Non-Stick Cookware Surfaces
Many Health Problems With Plastics (Made From Petroleum)
Healthier Microwave Food Preparation – Avoid Conventional Cooking Carcinogens

Chapter Eight: Photovoltaic Solar Electric Systems, Wind and Hydroelectric Energy

Half-Century-Old Space Age “Free” Electricity, Directly From the Sun
Bright Future of Advanced High-Efficiency Photovoltaic Solar Electric Systems
AC versus DC Lights and Appliances, in today’s Photovoltaic ZED World
One problem (opportunity) with Zero Energy Homes is that PV’s ARE DC
Solar-Powered Water Pumps – Many uses
Energy Star Program (good and bad things)
Energy Star AC versus DC Appliances
Innovative DC Lighting – Lowest Total Cost of Ownership – Most Beautiful / Interesting
DC Electronics – Can be LESS expensive than many of today’s AC devices / appliances
Photovoltaic System Sizing: 90% Conservation – NOT just PV on an inefficient home
Wind Energy – History, Source, Considerations, Innovations, Sizing and Future Investments
High Pressure Compressed Air Battery – On-demand efficient electricity generation
Putting Resources and Technology Together - In Harmony With Nature
“Free” water, electricity, heating, cooling, mechanical, and high-bandwidth telecom
Other Possible “Free Energy” With No Pollution, No Fuel, No Greenhouse Gas:
Micro Hydro, Wave Energy, Ocean Currents, Tidal Energy, Ocean Thermal, Geothermal

Chapter Nine: Low Income, Low Energy, Affordable (Subsidized) ZED Housing

Law abiding citizens in need – Especially disaster victims and those with disabilities
Energy crisis hurts those who can least afford it the most – Human compassion
Zero Energy Technology Innovations and creative new low-cost manufacturing (\$60/sq.ft.)
(4 bedroom 2 bath for only \$80,000, with NO ENERGY BILLS – R U Interested?)
Core Modular Equipment Cluster – Reliable Mass Production – Flexible Floor Plan Samples

Chapter Ten: Unique ZED House Plans, Detailed Specs, Construction Checklist

Every ZED Home is customized to buyers’ lifestyle, goals, location and budget
Detailed Construction Checklist ensures that all details are implemented correctly
ZED provides necessary training and construction assistance
Building Design Letter of Understanding – ZED Roles & Responsibilities

Chapter Eleven: What is a ZED Double Shell Home?

TWO SMALL DELTA T'S ARE MUCH BETTER THAN ONE LARGE DELTA T

Thermal Engineering Mathematics

A valuable proven low-cost energy solution, overlooked by most architects & builders

ZED Thermal Buffer Zone (TBZ) – Inexpensive, uniquely-effective SUPERINSULATION

Equalizing south side / north side temperature imbalance – Zoned HRF versus Double Shell

Winter Day – Solar gain warms the NORTH wall with free natural convection airflow loop

Winter Night – Ambient temperature earth + thermal mass warm the thermal buffer zone

Chapter Twelve: Summer Cooling A Double Shell Home In Hot Humid Climates

Critical Energy Conservation Techniques – Essential to all ZED Homes everywhere

Summer – Roof vents open – Cool, Dry, TBZ Replacement Air introduced at the base

Low-Cost Options: Cool Tubes, Geothermal Well / Radiator, Phase Change State

Transition, Century-Old Conventional Compressor A/C Problems, Refrigerants, Steam

Jet Cooling, Heat Pump, Water Jacketed Heat Pump, Ground Source Heat Pump,

Cooling Tower, Advanced Space Program Technology Heat Pipes (small-and-large scale),

Nearly-Zero Operating Cost Dehumidification (high SEER A/C can be less comfortable

with high humidity & poor enthalpy), Solar-Powered Absorption Chiller, Adsorption Chiller,

Superconducting Magnetic Refrigeration, Residential Photochemical Hydrogen Production

and Storage, Liquefied and Solidified gases (dry ice, et.al.), Rooftop Solar Panel Flexibility,

Desiccant Dehumidification System, Geothermal Hydronic Radiant Cooling Systems

(ambient earth temperature water-cooled ceiling), 24-Hour Solar Cooling Ice Battery:

Using Solar-Generated Ice to Cool and Dehumidify After Dark, Solar Heating Water to

Make Ice Freeze FASTER (unusual Mpemba Effect), Ice Alloy Research – “Pykrete”,

Igloos and Large Ice Hotels – In Florida?, Thermoelectric Peltier Solid State Cooling,

Endothermic Chemical Cooling, Air Cycle (Airplane and Train) Cooling, High Energy

Sonic Cooling Effect – MANY FUTURE ALTERNATIVE COOLING POSSIBILITIES

Double Shell Summer Cooling Summary

\$10,000,000 in R&D to produce \$10,000,000,000 in revenue (1,000 / 1 short-term ROI).

Appendix: Construction Materials and Techniques

Moisture Issues (7 out of 10 homes now have mold damage) – Stop Feeding Mold

Holistic Systems Engineering Approach

Expensive Energy Sources, Energy To Produce Building Materials and Buildings

Innovative 21st Century Material Science

Wood: NEVER EVER Build A Wooden Log / Solid Timber Home

Wooden Doors

Bamboo - Used in home construction for thousands of years

Conventional Pervasive Inefficient Wood Frame Construction

Advanced Wood Framing Techniques – Optimum Value Engineering (OVE)

Buildings should be designed in increments that match standard building materials

Number of Corners – Influences envelope cost AND thermal performance

Structural Insulated Panels (SIP's) – Wood, Concrete, Steel – Many Good Options

Wood Rot and Highly Carcinogenic CCA – Very-bad pressure treated “Green Wood”

Hurricane, Typhoon, and Tornado Engineering Considerations

Roof Decking Attachment – Glue and Screw, Bolts and Steel, Concrete

Fire: Only One ZED Home Fire That We know Of – A Surprising Good Outcome

Important Fire Prevention Lessons Learned

Computer Automated Steel Frame Construction

Concrete Block Construction – Problems, Weaknesses, and Limitations
Poured-In Place Steel-Reinforced Concrete Walls (and Roof)
Insulated Concrete Forms (ICF's) – Expensive way to buy EPS
Structural Concrete Insulated Panels (SCIP's) – Very popular and cost-effective in Europe
Monolithic-Poured Steel-Reinforced Tilt-Up Concrete Walls – Rapid growth in America
5+ inches of EXTERIOR EPS, Cast foam architectural features with fiber-reinforced EIFS
Dynamic, Expandable ZED Home
Revolutionary Dreams: Rotate Your ZED Home
What To Do With Unbuildable Land?

ZED Vision: *Energy Prototype Community Of Tomorrow*

Walt Disney's 1966 Vision for his Florida Experimental Prototype Community Of Tomorrow
- Always introducing, testing, and demonstrating new technology – Urban solutions
ZED Vision is to implement Walt Disney's original EPCOT concept for zero energy solutions
New planned communities of ZED homes for natural and man-made disaster victims
We strongly invite collaboration with other concerned individuals

ZED Speaking Engagements

ZED has all of your future energy answers – What are YOUR questions?

Larry Hartweg ZEDmaster@ZeroEnergyDesign.com

***“We did not inherit the Earth from our parents to plunder for our selfish desires.
We borrow it from our children, and we must return it to them one day soon.”***
- Based on an ancient Native American Proverb

**God and our children will judge the value of OUR lives by the way we leave the Earth.
Our grandchildren's legacy is in jeopardy. Zero Energy Design is long overdue.**

Abundant Energy In Harmony With Nature™